What is claimed is:

1. A positive-working radiation-sensitive composition comprising:

(a) a polymer capable of being dissolved in an alkaline aqueous solution; and

(b) a development-enhancing compound that increases the rate at which said composition dissolves in said solution after exposure to radiation, said compound comprising a hydrogen bond-substituting compound.

2. A positive-working radiation-sensitive composition comprising:

(a) a polymer capable of being dissolved in an alkaline aqueous solution; and

(b) a development-enhancing compound that increases the rate at which said composition can dissolve in said solution after exposure to radiation, said compound containing a functional group that is at least one of an alcohol, a phenolic hydroxyl, a carboxyl, a carboxylate, a thiol, a thiophenol, a thioacid and its salts, an amine, an imine, an amine oxide, an amide, an imide, a phosphorous-containing ester or amide, a phosphorus-containing quaternary ammonium salt, a polysiloxane having free hydroxyl groups, an organic or inorganic lithium salt and a fluorine-containing radical.

3. A composition according to claim 2, wherein said development-enhancing compound is selected from the group consisting of:

(a) an alcohol having an alkyl radical of C_{12} to C_{60}, a fluoroalkyl radical of C_4 to C_{60} or a fluoroalkylaryl radical of C_7 to C_{60};

(b) a C_3 to C_{500} polyol;

(c) a dihydric phenol;

(d) a tri-hydric phenol;

(e) a lithium salt that is one of a carboxylate, thiocarboxylate, sulfate, sulfonate, phosphate, phosphite, nitrate and nitrite; and

(f) a phosphorous-containing ester, amide or quaternary ammonium salt having at least one free hydroxyl group.

4. A composition according to claim 3, wherein said dihydric alcohol is resorcinol.

5. A composition according to claim 3, wherein said dihydric alcohol is one of 4-hexylresorcinol and n-dodecylresorcinol.

6. A composition according to claim 3, wherein said dihydric alcohol is one of catechol and an alkyl catechol.

7. A composition according to claim 3, wherein said trihydric phenol is one of pyrogallol, phloroglucinol, 1,2,4-benzenetriol and their alkyl and fluoroalkyl derivatives.

8. A composition according to claim 2, wherein said phosphorous-containing ester is one of $P(OH)(OR)_2$, $P(OH)_2(OR)$, $P(OH)_2[O\text{-}R\text{-}N(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)_2[O\text{-}R\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, where R is an alkyl, aryl, alkylaryl, polyethylene oxide, polypropyleneoxide or combination thereof.

9. A composition according to claim 2, wherein said phosphorous-containing amide is one of $P(OH)(ONHR)_2$, $P(OH)_2(ONHR)$, $P(OR)_2[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]_2$, where R is an alkyl, aryl, polyethylene oxide, polypropyleneoxide or combination thereof.

10. A composition according to claim 2, wherein said polysiloxane is $R[OSi(OCH_3)_2]_n\text{-}Si(OCH_3)(OH)_2$ where R is an alky, aryl, polyethyleneoxide, polypropyleneoxide group or combination thereof and n=2-1000.

11. A composition according to claim 3, wherein said lithium salt is one of lithium 3-(1H,1H,2H,2H-fluoroalkyl) propionate and 3-[(1H,1H,2H,2H-fluoroalkyl)thio]propionate, lithium trifluoromethane sulfonate and lithium perfluorooctylethylsulfonate.

12. A composition according to claim 2, wherein said development-enhancing compound is at least one of nonylphenol phosphate ester, dimethicone copolyol and an anionic surfactant based on lithium thiocarboxylate .

13. A composition according to claim 2, wherein the weight ratio of the polymer to the development-enhancing compound is in the range of 99:1 to 75:25.

14. A composition according to claim 2, further including a converter substance capable of converting radiation into heat.

15. A composition according to claim 14, wherein the radiation is at least one of light and infrared light.

16. A composition according to claim 15, wherein the converter substance is at least one of a pigment and an infrared dye.

17. A composition according to claim 16, wherein the pigment is at least one of carbon black, a phthalocyanine compound and a metal oxide and the dye is at least one of a cyanine dye, a methine dye, a naphthaquinone dye, a squarylium dye and a pyrylium dye.

18. A composition according to claim 2, wherein the polymer is at least one of:

(a) an acetal resin, and

(b) a polymer having at least one of a phenolic hydroxyl group, a sulfonamide group and an active imide group.

19. A composition according to claim 2, wherein the polymer has a weight-average molecular weight in the range of 2,000 to 20,000.

20. A composition according to claim 2, further comprising a compound that reduces the solubility of the polymer in the alkaline aqueous solution.

21. A composition according to claim 20, wherein the compound that reduces the solubility of the polymer in the solution is at least one of an infrared dye and an image colorant.

22. A composition according to claim 21, wherein the image colorant is one of Victoria Pure Blue BO and the tetrafluoroborate salt of Basic Blue 7.

23. A composition according to claim 2 wherein the amount of said development-enhancing compound is in the range of 1.5% to 10% by weight relative to the total weight of solids in said composition.

24. A composition comprising:

(a) an acetal resin formed by the condensation of polyvinyl alcohol with aldehydes,

(b) at least one of resorcinol, n-dodecyl resorcinol and 4-hexylresorcinol, and

(c) a substance capable of reducing the solubility of the acetal resin in alkaline aqueous solution.

25. The composition of claim 24, further comprising a converter substance capable of converting radiation into heat.

26. A positive-working lithographic printing precursor comprising:

(a) a hydrophilic lithographic base, and

(b) a radiation-sensitive coating on a surface of the base, the coating comprising:

(i) a polymer capable of being dissolved in an alkaline aqueous solution, and

(ii) a development-enhancing compound that increases the rate at which said coating dissolves in said solution after exposure to radiation, said compound comprising a hydrogen bond-substituting compound,

wherein the radiation-sensitive coating becomes more soluble in said alkaline aqueous solution after exposure to radiation.

27. A positive-working lithographic printing precursor comprising:

(a) a hydrophilic lithographic base, and

(b) a radiation-sensitive coating on a surface of the base, the coating comprising:

(i) a polymer capable of being dissolved in an alkaline aqueous solution; and

(ii) a development-enhancing compound that increases the rate at which said coating dissolves in said solution after exposure to radiation, said compound containing a functional group that is at least one of an alcohol, a phenolic hydroxyl, a carboxyl, a carboxylate, a thiol, a thiophenol, a thioacid and its salts, an amine, an imine, an amine oxide, an amide, an imide, a phosphorous-containing ester or amide, a phosphorous-containing quaternary ammonium salt, a polysiloxane having free hydroxyl groups, an organic or inorganic lithium salt and a fluorine-containing radical,

wherein the radiation-sensitive coating becomes more soluble in said alkaline aqueous solution after exposure to radiation.

28. A precursor according to claim 27, wherein said development-enhancing compound is selected from the group consisting of:

(a) an alcohol having an alkyl radical of C_{12} to C_{60}, a fluoroalkyl radical of C_4 to C_{60} or a fluoroalkylaryl radical of C_7 to C_{60};

(b) a C_3 to C_{500} polyol;

(c) a dihydric phenol;

(d) a tri-hydric phenol;

(e) a lithium salt that is one of a carboxylate, thiocarboxylate, sulfate, sulfonate, phosphate, phosphite, nitrate and nitrite; and

(f) a phosphorous-containing ester, amide or quaternary ammonium salt having a free hydroxyl group.

29. A precursor according to claim 27, wherein said dihydric alcohol is resorcinol.

30. A precursor according to claim 28, wherein said dihydric alcohol is one of 4-hexylresorcinol and n-dodecylresorcinol.

31. A precursor according to claim 28, wherein said dihydric alcohol is one of catechol and an alkyl catechol.

32. A precursor according to claim 28, wherein said trihydric phenol is one of pyrogallol, phloroglucinol, 1,2,4-benzenetriol and their alkyl and fluoroalkyl derivatives.

33. A precursor according to claim 7, wherein said phosphorous-containing ester is one of $P(OH)(OR)_2$, $P(OH)_2(OR)$, $P(OH)_2[O\text{-}R\text{-}N(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)_2[O\text{-}R\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, where R is an alkyl, aryl, alkylaryl, polyethylene oxide, polypropyleneoxide or combination thereof.

34. A precursor according to claim 27, wherein said phosphorous-containing amide is one of $P(OH)(ONHR)_2$, $P(OH)_2(ONHR)$, $P(OR)_2[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]_2$, where R is an alkyl, aryl, polyethylene oxide, polypropyleneoxide or combination thereof.

35. A precursor according to claim 27, wherein said polysiloxane is $R[OSi(OCH_3)_2]_n\text{-}Si(OCH_3)(OH)_2$ where R is an alky, aryl, polyethyleneoxide, polypropyleneoxide group or combination thereof and n=2-1000.

36. A precursor according to claim 28, wherein said lithium salt is one of lithium 3-(1H,1H,2H,2H-fluoroalkyl) propionate and 3-[(1H,1H,2H,2H-fluoroalkyl)thio]propionate, lithium trifluoromethane sulfonate and lithium perfluorooctylethylsulfonate.

37. A precursor according to claim 27 wherein the amount of said development-enhancing compound in said coating is in the range of 1.5% to 10% by weight.

38. A precursor according to claim 27, wherein said development-enhancing compound is at least one of nonylphenol phosphate ester, dimethicone copolyol and an anionic surfactant based on lithium thiocarboxylate.

39. A precursor according to claim 27, further including a converter substance capable of converting radiation into heat.

40. A precursor according to claim 39, wherein the radiation is at least one of light and infrared light.

41. A precursor according to claim 40, wherein the converter substance is at least one of a pigment and an infrared dye.

42. A precursor according to claim 41, wherein the pigment is at least one of carbon black, a phthalocyanine compound and a metal oxide and the dye is at least one of a cyanine dye, a methine dye, a naphthaquinone dye, a squarylium dye and a pyrylium dye.

43. A precursor according to claim 27, wherein the polymer is at least one of:

(a) an acetal resin, and

(b) a polymer having at least one of a phenolic hydroxyl group, a sulfonamide group and an active imide group.

44. A precursor according to claim 27, wherein the polymer has a weight-average molecular weight in the range of 2,000 to 20,000.

45. A precursor according to claim 27, further comprising a compound that reduces the solubility of the polymer in the alkaline aqueous solution.

46. A precursor according to claim 45, wherein the compound that reduces the solubility of the polymer in the solution is at least one of an infrared dye and an image colorant.

47. A precursor according to claim 46, wherein the image colorant is one of Victoria Pure Blue BO and the tetrafluoroborate salt of Basic Blue 7.

48. A positive-working lithographic printing precursor comprising:

(a) a hydrophilic lithographic base, and

(b) a radiation-sensitive coating on a surface of the base, the coating comprising:

(i) an acetal resin formed by the condensation of polyvinyl alcohol with aldehydes,

(ii) at least one of resorcinol, n-dodecyl resorcinol and 4-hexyl resorcinol, and

(iii) a substance capable of reducing the solubility of the acetal resin in an alkaline aqueous solution.

49. A precursor according to claim 48, he radiation-sensitive coating further comprising a converter substance capable of converting radiation into heat.

50. A method for making a lithographic printing precursor, comprising the steps of:

(a) forming a coating of a composition on a hydrophilic lithographic base, the composition comprising:

(i) a polymer capable of being dissolved in an alkaline aqueous solution, and

(ii) a development-enhancing compound that increases the rate at which said composition dissolves in said solution after exposure to radiation, said compound comprising a hydrogen bond-substituting compound.

51. A method for making a lithographic printing precursor, comprising the steps of:

(a) forming a coating of a composition on a hydrophilic lithographic base, the composition comprising:

(i) a polymer capable of being dissolved in an alkaline aqueous solution, and

(ii) a development-enhancing compound that increases the rate at which said composition can dissolve in said solution after exposure to radiation, said compound containing a functional group that is at least one of an alcohol, a phenolic hydroxyl, a carboxyl, a carboxylate, a thiol, a thiophenol, a thioacid and its salts, an amine, an imine, an amine oxide, an amide, an imide, a phosphorous-containing ester or amide, a phosphorus-containing quaternary ammonium salt, a polysiloxane having free hydroxyl groups, an organic or inorganic lithium salt and a fluorine-containing radical,

(b) drying the coating to form a radiation-imageable layer,

wherein the radiation-imageable layer becomes more soluble in said alkaline aqueous solution upon exposure to radiation.

52. The method of claim 51, wherein said development-enhancing compound is selected from the group consisting of:

(a) an alcohol having an alkyl radical of C_{12} to C_{60}, a fluoroalkyl radical of C_4 to C_{60} or a fluoroalkylaryl radical of C_7 to C_{60};

(b) a C_3 to C_{500} polyol;

(c) a dihydric phenol;

(d) a tri-hydric phenol;

(e) a lithium salt that is one of a carboxylate, thiocarboxylate, sulfate, sulfonate, phosphate, phosphite, nitrate and nitrite; and

(f) a phosphorous-containing ester, amide or quaternary ammonium salt having a free hydroxyl group.

53. The method of claim 52, wherein said dihydric alcohol is resorcinol.

54. The method of claim 52, wherein said dihydric alcohol is one of 4-hexyl resorcinol and n-dodecylresorcinol.

55. The method of claim 52, wherein said dihydric alcohol is one of catechol and an alkyl catechol.

56. The method of claim 52, wherein said trihydric phenol is one of pyrogallol, phloroglucinol, 1,2,4-benzenetriol and their alkyl and fluoroalkyl derivatives.

57. The method of claim 51, wherein said phosphorous-containing ester is one of $P(OH)(OR)_2$, $P(OH)_2(OR)$, $P(OH)_2[O\text{-}R\text{-}N(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)_2[O\text{-}R\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, where R is an alkyl, aryl, alkylaryl, polyethylene oxide, polypropyleneoxide or combination thereof.

58. The methold of claim 51, wherein said phosphorous-containing amide is one of $P(OH)(ONHR)_2$, $P(OH)_2(ONHR)$, $P(OR)_2[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]$, $P(OR)[O\text{-}NH(CH_2\text{-}CH_2\text{-}OH)_2]_2$, where R is an alkyl, aryl, polyethylene oxide, polypropyleneoxide or combination thereof.

59. The method of claim 51, wherein said polysiloxane is $R[OSi(OCH_3)_2]_n\text{-}Si(OCH_3)(OH)_2$ where R is an alky, aryl, polyethyleneoxide, polypropyleneoxide group or combination thereof and n=2-1000.

60. The method of claim 52, wherein said lithium salt is one of lithium 3-(1H,1H,2H,2H-fluoroalkyl) propionate and 3-[(1H,1H,2H,2H-fluoroalkyl)thio]propionate, lithium trifluoromethane sulfonate and lithium perfluorooctylethylsulfonate.

61. The method of claim 51, wherein the development-enhancing compound is at least one of lithium trifluoromethane sulfonate, nonylphenol phosphate ester, dimethicone copolyol and an anionic surfactant based on lithium thiocarboxylate .

62. The method of claim 51, wherein the composition further includes a converter substance capable of converting radiation into heat.

63. The method of claim 62, wherein the radiation is at least one of light and infrared light.

64. The method of claim 63, wherein the converter substance is at least one of a pigment and an infrared dye.

65. The method of claim 64, wherein the pigment is at least one of carbon black, a phthalocyanine compound and a metal oxide and the dye is at least one of a cyanine dye, a methine dye, a naphthaquinone dye, a squarylium dye and a pyrylium dye.

66. The method of claim 51, wherein the polymer is at least one of:

(a) an acetal resin, and

(b) a polymer having at least one of a phenolic hydroxyl group, a sulfonamide group and an active imide group.

67. The method of claim 51, wherein the polymer has a weight-average molecular weight in the range of 2,000 to 20,000.

68. The method of claim 51, further comprising a compound that reduces the solubility of the polymer in the alkaline aqueous solution.

69. The method of claim 68, wherein the compound that reduces the solubility of the polymer in the solution is at least one of an infrared dye and an image colorant.

70. The method of claim 69, wherein the image colorant is Victoria Pure Blue BO.

71. A method for making a positive-working lithographic printing precursor, comprising the steps of:

(a) forming a coating of a composition on a hydrophilic lithographic base, the composition comprising:

(i) an acetal resin formed by the condensation of polyvinyl alcohol with aldehydes,

(ii) at least one of resorcinol, n-dodecyl resorcinol and 4-hexyl resorcinol, and

(iii) a substance capable of reducing the solubility of the acetal resin in alkaline aqueous solution; and

(b) drying the coating to form a radiation-imageable layer,

wherein the radiation-imageable layer becomes more soluble in alkaline aqueous solution upon exposure to radiation.

72. The method of claim 71, the radiation-sensitive coating further comprising a converter substance capable of converting radiation into heat.

73. A lithographic master comprising:

(a) a hydrophilic lithographic base, and

(b) an imagewise distributed layer of a coated and dried composition, the composition comprising:

(i) a polymer capable of being dissolved in an alkaline aqueous solution, and

(ii) at least one of resorcinol, n-dodecyl resorcinol, 4-hexyl resorcinol, lithium trifluoromethane sulfonate, nonylphenol phosphate ester, dimethicone copolyol and an anionic surfactant based on lithium thiocarboxylate.

74. A lithographic master comprising:

(a) a hydrophilic lithographic base, and

(b) an imagewise distributed layer of a coated and dried composition, the composition comprising:

(i) an acetal resin formed by the condensation of polyvinyl alcohol with aldehydes,

(ii) at least one of resorcinol, n-dodecyl resorcinol and 4-hexyl resorcinol, and

(iii) a substance capable of reducing the solubility of the acetal resin in alkaline aqueous solution.

75. A method for making a lithographic master, the method comprising imagewise exposing the positive-working lithographic precursor of claim 27 to infrared radiation and treating the resulting imaged precursor with alkaline aqueous solution to remove the exposed parts of the radiation-sensitive coating.

76. A method for making a lithographic master, the method comprising imagewise exposing the positive-working lithographic precursor of claim 48 to infrared radiation and treating the resulting imaged precursor with alkaline aqueous solution to remove the exposed parts of the radiation-sensitive coating.